

### REMARKS

This responds to the Office Action mailed on September 21, 2005, and the references cited therewith.

Claims 1,2, 6-11 are amended. Claim 3 is are canceled. As a result, claims 1, 2, 4-11 are now pending in this application.

No new matter has been added by the amendments of the specification and claims. Applicants have amended the specification in the examples, particularly Example 2, at page 7, line 27; Example 11, at page 10, line 8; Example 13, at page 10, line 29; Example 15, at page 11, line 20; and Example 17, at page 12, line 12; to correct minor clerical errors. These amendments are to cancel the term "ethanol" to insert the correct term, n-butanol. These examples used poly-n-butyl acrylate as a starting material, which will produce n-butanol as the product, not ethanol. It is respectfully submitted that a person skilled in the art would recognize that this amendment was a minor clerical error.

Support for the amendments of the claims will be found in the original claims. They follow the amendments made during the prosecution of the parent of the present application, U.S. Patent No. 6,596,816. Support for these amendments is discussed in the prosecution of that parent patent. Applicants' additional amendments of the claims place those claims in proper U.S. format, e.g., the European style "Use" claims have been rewritten as composition claims.

Applicants have also amended the specification to correctly identify trademarks and to indicate the subject matter of these trademarks. The trademark "Desmodur" stands for hexamethyl diisocyanate, a cross-linking agent. A web search using the "Google" search engine will show that the "Desmodur" trademark for this commercial product is owned by Bayer AG. The trademark "Macrynal" stands for a hydroxyl functional acrylic polymer. A web search using the "Google" search engine will show that the "Macrynal" trademark for this commercial product is owned by Solutia Inc.

Applicants have also amended the Abstract to shorten it and indicate the amines used for aminolysis.

Double Patenting Rejection

Claims 1-7 and 10-11 were rejected under the judicially created doctrine of obviousness-type double patenting rejection, specifically U.S. Patent No. 6,596,816. Applicants do not admit that the claims are obvious in view of U.S. Patent No. 6,596,816. However, a Terminal Disclaimer in compliance with 37 C.F.R. 1.321(b)(iv) will be submitted upon notification of a provisional allowance over the other rejections.

§112 Rejection of the Claims

The Patent Office rejected claims 1-11 under 35 U.S.C. § 112, second paragraph, for indefiniteness.

Pursuant to the Patent Office suggestions, Applicants have amended the claims to eliminate the “obtainable by” phrase, to eliminate the pseudo - Markush group language in some instances and to correct it in others, to eliminate overlap with the claims of Applicants’ parent patent, to correct the antecedent bases for claim terms and to eliminate vague language such as “different monomer.”

Applicants submit that these amendments overcome the §112 rejections and respectfully request withdrawal of this rejection.

§102 Rejection of the Claims

The Patent Office has rejected claims 1-7 and 10-11 under 35 U.S.C. 102(e) as being anticipated by Tsubaki et al., 5,717,048, has rejected claims 1-6 under 35 U.S.C. 102(b) as being anticipated by Thomas et al., 2,595,907 and has rejected claim 1-7 and 9-11 under 35 U.S.C. 102(b) as being anticipated by Naarmann et al., U.S. Patent No. 4,060,679.

Applicants respond that their pending claims, as amended, overcome these rejections. Applicants have amended their claims to recite that the dispersing agent is an acrylic ester-acrylamide polymer made by aminolysing an acid alkyl ester polymer with one or more amines. Applicants only use primary amines substituted by nitrogen heterocyclic groups and optional alkphatic, aryl or alkoxy groups so that the resulting acrylamide units contain no primary or secondary amine substituents. They only contain nitrogen heterocycle substituents and optional

CH substituents. Applicants also transesterify at least some of the acrylic ester groups with specified long chain alcohols.

### Tsubaki

Tsubaki discloses that his polymers contain from 85 to 95 mole percent ethylene monomeric units ( $-\text{CH}_2-\text{CH}_2-$ ), 0.1 to 10 mole percent acrylic ester units wherein the esterifying alkyl group contains 1 to 4 carbons, 0.1 to 6 mole percent acrylic acid units and 1 to 12 mole percent acrylamide units.

Tsubaki's polymers differ from Applicants' claimed dispersing agent for the following reasons.

- 1) The backbone of Tsubaki's polymers is made of a substantial majority of unsubstituted ethylene monomeric units while Applicants' polymers are not. Applicants' polymer backbone is made from (meth)acrylic acid/ester/amide units, as well as optional substituted vinyl units such as styrene or ester substituted vinyl units such as maleic esters, itaconic esters and the like. All of these units are substituted with pendant groups while the majority of Tsubaki's units are unsubstituted.
- 2) Tsubaki's polymers contain quaternary ammonium ( $\text{R}_3\text{N}-\text{C}-$ ) substituted (meth)acrylamide units (formula IV, col. 4 of Tsubaki). Applicants' polymers contain nitrogen heterocycle substituted (meth)acrylamide units.

For these reasons, Tsubaki's polymers do not anticipate Applicants' claims, as amended. Applicants respectfully request withdrawal of the rejection over Tsubaki.

### Thomas

Thomas discloses a copolymer of acrylamide and acrylonitrile. He states at col. 1, lines 4-15 that his polymerizable composition includes (1) the acrylamide of formula I, and (2) acrylonitrile. Note the disclosure of the polymer products col. 1 lines 32-39 which are said to contain 99.5 to about 85 % acrylonitrile. Also, all of Thomas' examples use acrylonitrile. Applicants do not claim a polymer containing acrylonitrile units.

For this reason, Thomas does not anticipate Applicants' claims. Applicants respectfully request withdrawal of the rejection over Thomas.

Naarmann

Naarmann discloses dialkyl substituted amine groups as the side chains of his acrylamide moieties of his polymer and discloses only methyl (meth)acrylate as an additional monomer for his copolymer. Naarmann also discloses that his polymers range in molecular weight from 600 to 4500. Finally, Naarmann prepares his polymer by polymerizing together acrylic ester monomers, olefinic monomers, such as styrene and acrylamide monomers.

Applicants' claims, as amended, recite the presence of nitrogen heterocycle groups as the side chains of their acrylamide moieties of their acrylic ester acrylamide polymer and recite that the acrylic ester groups are transesterified at least in part with a long chain alcohol. Applicants' claims also recite that the molecular weight range of their polymer composition ranges from 1000 to 50,000, and that the acrylic ester acrylamide polymer is the aminolysis and transesterification product of an acrylic ester, amines and long chain alcohols.

Applicants' claimed acrylic ester acrylamide polymer differs from Naarmann's polymers on these bases. Naarmann does not disclose a heterocyclic side chain substituent for his acrylamide monomer. Nor does he disclose a long chain alcohol as a side chain substituent for his acrylic ester monomer. Because Naarmann polymerizes acrylic esters and acrylamides together, he is unable to produce acrylamide polymer units having heterocyclic side chain substitutions nor acrylic ester polymer units having long chain alcohol side chain substitutions. Such acrylamide and acrylic ester monomers are not available as Applicants point out.

Also, Naarmann's average molecular weight range is low compared with the recited average molecular weight range. While there is some overlap, that overlap is minimal. Naarmann's molecular weight extends only to 4,500 while Applicants' average molecular weight extends to 50,000. This difference is connected to the different uses of the polymers. Naarmann's polymer is used as a paper sizing polymer. As such, its viscosity is low, and when dried, it will not cause toughness. Otherwise, it would render the paper substrate incapable of use in printers. In contrast, Applicants' polymers have higher average weights because they are used as dispersing agents. Their higher molecular weight contributes viscosity to the pigment or

composition and enables toughness of the dried composition as a paint or coating for metal substrates.

Finally, Naarmann's copolymerization of acrylic esters (hydrophobic) and amine substituted acrylamides (hydrophilic) will produce a copolymer having a high polydispersity. These monomers react at different rates and differentially affect polymer chain termination. As a result, the chain lengths of the resulting polymer molecules will widely vary. That wide variation produces a large spread of molecular weight and consequently a high polydispersity.

In contrast, Applicants begin with either a homopolymer such as poly (butyl acrylic ester) or a copolymer of hydrophobic monomers that will react at the same or approximately the same polymerization rates. The result is a distribution of polymer molecular weights of a narrow spread, i.e., a low polydispersity. Consequently, as Applicants point out, the narrower molecular weight distribution combined with the use of nitrogen heterocycle side chains for the acrylamide units provides an improved pigment dispersing agent. The presence of very low and very high molecular weight polymers is minimized so that the dispersing power per mole of polymer is increased.

For these reasons, Applicants submit that their claims, as amended, are not anticipated by Naarmann. Applicants respectfully request withdrawal of the rejection over Naarmann.

#### §§ 102/103 Rejection of the Claims

The Patent Office has rejected claims 1-11 as anticipated under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Melamed, (U.S. Patent No. 2,980,657).

Applicants respond that their claims, as amended, overcome this rejection.

Melamed discloses acrylamide polymers having quaternary ammonium side chains. The amine group of this quaternary ammonium side chain is substituted by four organic groups. This substitution is characteristic for the intended purpose of Melamed's polymers, a water soluble antibacterial agent.

Applicants' claimed polymer does not contain quaternary ammonium side chain substituents. Nor is it water soluble. Quite the contrary; Applicants' claimed polymer is not

significantly water soluble. Otherwise, the coatings containing it would absorb water! That is not a desirable result for car paint.

For these reasons, Applicants submit that their claims, as amended, are not anticipated or rendered obvious by Melamed. Applicants respectfully request withdrawal of this rejection.

### §103 rejection of the Claims

The Patent Office has also rejected claims 1-11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Emmons et al., (U.S. Patent No. 4,120,839).

Applicants submit that their claims, as amended, overcome this rejection.

Emmons discloses an acrylic copolymer containing substituted acrylamide, acrylic C1 to C6 ester moieties and optional acrylic C1 to C18 ester moieties (See the abstract). Emmons makes his copolymer by aminolysis of an acrylic ester homopolymer or acrylic ester copolymer (See the abstract). Emmons discloses that the polyamine used to aminolyze his acrylate polymer contains primary and/or secondary amine groups in addition to the primary amine group that is converted to an amide group upon aminolysis (col. 3, lines 35-59). The presence of these additional primary and/or secondary amine groups in the final Emmons product is necessary so that this product can cure epoxy resins. Primary and secondary amine groups readily react with epoxy groups to ensure hardening of the epoxy resin.

In contrast, Applicants' dispersing agent does not contain any side chain substituent with a primary or secondary amine group. Applicant's dispersing agent contains only nitrogen heterocycle and option CH side chain substituents. Consequently, Emmons does not suggest Applicants' invention. For these reasons, Applicants submit that their claims overcome the rejection based upon Emmons. Applicants respectfully request withdrawal of this rejection.

### CONCLUSION

Applicants respectfully solicit reconsideration of their Application and Claims, as amended. Applicants submit that the amended claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6939 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date

Jan 3, 2006

By

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 3rd day of January, 2006.

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